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OCEANIC MESOSCALE PROCESSES DETERMINED FROM SATELLITE ALTIMETRY AND THE PROSPECTS OF A WIDE-SWATH RADAR ALTIMETER

The presence of more than one satellite altimeter simultaneously in the past 15 years has led to significant progress in the knowledge of the global oceanic mesoscale processes, which contain most of the kinetic energy of the ocean. Based on a method of tracking the maximum space/time-lagged correlation in SSH anomalies from merged altimeter data from TOPEX/Poseidon (succeeded by Jason) and ERS-1 and 2 (succeeded by Envisat), the propagation velocity of ocean eddy variability was mapped globally. Detailed patterns of the effects of major ocean currents and bottom topography on the propagation of ocean eddy variability have been revealed. Comparisons were made to the simulation of ocean general circulation models, of which the capability of describing the eddy propagation (at least for large eddies) was confirmed. However, the resolution of the data record is limited to scales larger than 150-300 km. The knowledge of the variability at scales much shorter is essential for understanding the dynamics of ocean currents, especially the dissipation of kinetic energy that is key to understanding the time scales of ocean's response to external forcing. The prospects of a wide-swath altimeter based on radar interferometry for studying the ocean variability unresolved by conventional radar altimetry will be discussed.

Oral presentation

Presentation is given by student: No
Session #:006
Date: 03-05-2008
Time: 14:45

Back